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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
FUREMAN, JARED	
ART UNIT	PAPER NUMBER
2876	

DATE MAILED: 07/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/907,363	CHEN, BO SU	
	Examiner	Art Unit	
	Jared J. Fureman	2876	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 17 July 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Receipt is acknowledged of the IDS, filed on 8/17/2001, which has been entered in the file. Claims 1-32 are pending.

Specification

1. The abstract of the disclosure is objected to because the abstract is greater than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claims 13, 21, and 24 are objected to because of the following informalities:

Re claim 13: Claim 13 is an apparatus claim that depends from method claim 1. It appears as though claim 13 should depend from claim 11. For examination purposes, claim 13 has been interpreted so as to depend from claim 11.

Re claim 21: Claim 21 depends from itself. For examination purposes, claim 21 has been interpreted so as to depend from claim 20, since claim 20 provides antecedent basis for "said Vertical Cavity Surface-Emitting Laser".

Re claim 24, lines 7 and 9: "said bar code" lacks proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United Stat s.

4. Claims 1, 3-13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Burke, Jr (US 3,688,570).

Re claims 1 and 3-10: Burke, Jr teaches a method for analyzing the performance of a mechanical system wherein light is directed from at least one light source (32) to encoded portions (grids G_1 and G_2) of two rotating members (shells 14 and 22, respectively) associated with said mechanical system, said method comprising the steps of: reflecting a portion of said light to at least one encoded portion of said rotating members; detecting (via photodetectors 48 and 53) a reflected portion of said light; and recovering information from said reflected portion of said light, wherein said reflected portion of said light contains performance characteristic (torque, for example) data of said mechanical system; wherein said at least one encoded portion of said rotating members comprises two identical bar codes (the grids G_1 and G_2 have lines and spaces, and thus, can be considered a bar code); wherein said at least one encoded portion of said rotating members comprises a measuring feature formed along circumferential edges of said rotating members (the grids G_1 and G_2 are a measuring feature); wherein said measuring feature formed along circumferential edges of said rotating members comprises at least one optical encoder (the grids G_1 and G_2 are an optical encoder) for encoding performance characteristic data of said mechanical system; configuring at least one measuring feature to form a plurality of measuring features comprising a vernier (the grids G_1 and G_2 include a plurality of grid lines, thus, comprising a vernier) for measuring movement within said mechanical system; shaping said at least one encoded portion of said rotating member to increase reflection of said

reflected light in a particular direction (the grids G_1 and G_2 include reflective portions); reflecting light beams from at least one encoded portion (grid G_1, for example) of said rotating members to interact with at least one other encoded portion of said rotating members (grid G_2, for example) to form Moiré fringes on a sensor plate (photodetectors 48 and 53); assessing the reliability of said mechanical system utilizing said performance characteristic data of said mechanical system; generating an electrical feedback signal (the photodetectors 48 and 53 generate an electrical signals) from recovered information containing said performance characteristic data of said mechanical system; and providing said electrical feedback signal to an input (signal processing circuitry 49) of said mechanical system, thereby improving said performance characteristic data of said mechanical system (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

Re claims 11-13 and 16: The teachings of Burke, Jr have been discussed above. Burke, Jr also teaches an apparatus for analyzing the performance of a mechanical system having a rotating member (shells 14 and 22) therein, said apparatus comprising: directing mechanism for directing light from a light source (32) in order to intercept an encoded portion (grids G_1 and G_2) of said rotating member; reflecting mechanism for reflecting a portion of said light from said encoded portion of said rotating member (the grids G_1 and G_2 include reflective portions); and detecting mechanism (photodetectors 48 and 53) for detecting a reflected portion of said light to recover performance data maintained therein, wherein said performance data contains performance characteristics (torque, for example) of said mechanical system; recovery mechanism

(signal processing circuitry) for recovering said performance data; reflecting mechanism for reflecting a portion of said light through said encoded portion of said rotating member; wherein said encoded portion of said rotating member comprises a bar code (the grids G_1 and G_2 have lines and spaces, and thus, can be considered a bar code) (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 17-19, and 24-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burke, Jr in view of Bechtel et al (US 5,001,937, cited by applicants).

The teachings of Burke, Jr have been discussed above. Burke, Jr also teaches an apparatus for detecting the relative motion between two rotating members (shells 14 and 22) in a mechanical system having a light source (32) for generating light beams, said apparatus comprising: at least one first reflector located on a first rotating member positioned such that the reflection of a first light beam forms an encoded portion of said first rotating member (shell 14 includes grid G_1 having reflective portions); at least one second reflector located on a second rotating member positioned such that the reflection of a second light beam forms an encoded portion of said second rotating member (shell 22 includes grid G_2 having reflective portions); and at least one detector

(photodetectors 48 and 53) that detects Moiré fringes formed as a result of the interaction of images from said first and second encoded portions of said first and second rotating members, wherein said detector is located proximate to said mechanical system; wherein the encoded portions have parallel lines (the grid lines) which are spaced evenly, thereby forming a gap therebetween, wherein a width associated with the gap is identical to a width of the parallel lines; a sensor (signal processing circuitry 49) that analyzes a signal from said detection mechanism, thereby monitoring motion associated with said Moiré fringes, wherein said sensor is located proximate to said mechanical system; said first light beam intercepts said first encoded portion of said first rotating member (grid G_1 of shell 14) at an angle of incidence of "a"; and a second light beam, identical to said first light beam, intercepts said second encoded portion of said second rotating member (grid G_2 of shell 22) at an angle of incidence of "a"; wherein said first light beam carries an image of a bar code (the grid G_1 has lines and spaces, and thus, can be considered a bar code) after being reflected from said first encoded portion of said first rotating member; and wherein said second light beam carries an image of a bar code (the grid G_2 has lines and spaces, and thus, can be considered a bar code) after being reflected off said second encoded portion of said second rotating member; wherein an image from said first encoded surface interacts with an image of said second encoded surface after said light beams are reflected off said first and second rotating surfaces to produce Moiré fringes; wherein Moiré fringes are observed on a sensor plate (photodetectors 48 and 53); wherein said sensor plate is located at a Talbot distance from a point where said reflected light

beams originate from said encoded surface of said first and second rotating members; wherein said detection mechanism is located on said sensor plate; wherein said encoded portion of said rotating member is shaped to increase said reflected light in a particular direction; wherein said encoded portion of a rotating member is shaped to form an optical encoder (the grids G_1 and G_2 are an optical encoder) for encoding data representing performance characteristics (torque, for example) of said mechanical system; wherein said encoded portion of a rotating member is provided as a vernier on said rotating member to increase accuracy for sensing motion thereof (the grids G_1 and G_2 include a plurality of grid lines, thus, comprising a vernier); wherein said encoded portion of said rotating member comprises measuring features recessed into a surface or edge of said rotating member (the grid lines are recessed into a surface of the shells 14 and 22) (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

Burke, Jr fails to specifically teach the apparatus having two identical light sources for generating two identical light beams, at least two collimating lenses located in an optical path of said mechanical system, wherein said collimating lenses render said light beams from said light sources into highly collimated parallel light beams; and at least two optical elements that operate on said light beams after passing through said at least two collimating lenses, thereby directing said light beams to intercept said encoded portions on said first and second rotating members.

Bechtel et al teaches an apparatus for detecting the relative motion between two rotating members (bands 2 and 3) in a mechanical system having two identical light

sources (lasers 18) for generating two identical light beams; at least two collimating lenses (each sensor head 4 and 5 includes a lens 20) located in an optical path of said mechanical system, wherein said collimating lenses render said light beams from said light sources into highly collimated parallel light beams; and at least two optical elements (each sensor head includes a filter 24) that operate on said light beams after passing through said at least two collimating lenses, thereby directing said light beams to intercept encoded portions (regions of high and low reflectivity) on said first and second rotating members (see figures 1, 2, 4, column 1 line 50 - column 2 line 15, column 2 lines 40-58, and column 3 lines 30-64).

In view of Bechtel et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the apparatus as taught by Burke, Jr, the apparatus having two identical light sources for generating two identical light beams, at least two collimating lenses located in an optical path of said mechanical system, wherein said collimating lenses render said light beams from said light sources into highly collimated parallel light beams; and at least two optical elements that operate on said light beams after passing through said at least two collimating lenses, thereby directing said light beams to intercept said encoded portions on said first and second rotating members, in order to provide the apparatus with modular light sources, thereby simplifying replacement of the light sources in the event of a failure.

7. Claims 2, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burke, Jr in view of Cui et al (US 6,399,940 B1).

The teachings of Burke, Jr have been discussed above.

Burke, Jr fails to specifically teach the light source comprising a vertical cavity surface-emitting laser, wherein said light source comprises at least two identical vertical cavity surface emitting units.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (254) (see figure 6 and column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Burke, Jr, the light source comprising a vertical cavity surface-emitting laser, wherein said light source comprises at least two identical vertical cavity surface emitting units, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

8. Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burke, Jr as modified by Bechtel et al further in view of Cui et al.

The teachings of Burke, Jr as modified by Bechtel et al have been discussed above.

Re claims 20 and 21: Burke, Jr as modified by Bechtel et al fails to specifically teach the light sources comprising at least two vertical cavity surface-emitting laser units; wherein light beams from said vertical cavity surface-emitting laser units are rendered highly collimated by convex collimating lenses before said light beams intercept encoded portions of said first and second rotating members.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (254); wherein a light beam from said vertical cavity surface-emitting laser are rendered highly collimated by convex collimating lenses (prism 256) (see figure 6 and column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the apparatus as taught by Burke, Jr as modified by Bechtel et al, the light comprising a vertical cavity surface emitting laser; wherein light beams from said vertical cavity surface-emitting laser units are rendered highly collimated by convex collimating lenses before said light beams intercept encoded portions of said first and second rotating members, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

Re claims 22 and 23: The teachings of Burke, Jr as modified by Bechtel et al and Cui et al have been discussed above.

Burke, Jr as modified by Bechtel et al and Cui et al fails to specifically teach fails to specifically teach encoded portions comprising: a transparent polymer film having parallel lines of opaque bar code imprinted on an upper surface of said transparent polymer film; and wherein said parallel lines are spaced evenly, thereby forming a gap therebetween, wherein a width associated with said gap is identical to a width of said parallel lines, such that said transparent polymer film is adhesively attached to a rotating member; and wherein said parallel lines are positioned at angle in relation to an axis of rotation of said rotating members; said transparent polymer film comprises a bar code

when adhered to a rotating disk; and wherein said bar code is adhered along a circumferential edge of said rotating member.

However, Bechtel et al also teaches the encoded portions comprising: a transparent polymer film (the bands 2 and 3 may be applied as an adhesive tape, see column 1 lines 50-57) having parallel lines (13) of opaque bar code imprinted on an upper surface of said transparent polymer film; and wherein said parallel lines are spaced evenly, thereby forming a gap (12) therebetween, such that said transparent polymer film is adhesively attached to a rotating member (shaft 1); and wherein said parallel lines are positioned at angle in relation to an axis of rotation of said rotating members; said transparent polymer film comprises a bar code (the low and high reflectivity regions, 12 and 13, respectively, form a bar code) when adhered to a rotating disk; and wherein said bar code is adhered along a circumferential edge of said rotating member (the bands 2 and 3 are adhered along a circumferential edge of the shaft 1) (see figures 1, 2, 4, column 1 line 50 - column 2 line 15, column 2 lines 40-58, and column 3 lines 20-64).

In view of Bechtel et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the apparatus as taught by Burke, Jr as modified by Bechtel et al and Cui et al, the encoded portions comprising: a transparent polymer film having parallel lines of opaque bar code imprinted on an upper surface of said transparent polymer film; and wherein said parallel lines are spaced evenly, thereby forming a gap therebetween, wherein a width associated with said gap is identical to a width of said parallel lines, such that said transparent polymer film is

adhesively attached to a rotating member; and wherein said parallel lines are positioned at angle in relation to an axis of rotation of said rotating members; said transparent polymer film comprises a bar code when adhered to a rotating disk; and wherein said bar code is adhered along a circumferential edge of said rotating member, in order to provide the ability to add additional, or replace existing damaged encoded portions, by simply attaching another encoded portion.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Horton et al (US RE37,969 E), Dalton et al (US 2003/0010137 A1), Pinnock (US 6,285,024 B1), Yagita (US 6,089,455), Renner et al (US 4,641,027), Wilson (US 3,194,065), Pinnock (WO 99/39169 A1), and Chino et al (DE 197 38 965 A1) all teach methods and apparatus for measuring the performance of a system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared J. Fureman whose telephone number is (703) 305-0424. The examiner can normally be reached on 7:00 am - 4:30 PM M-T, and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on (703) 305-3503. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Jared J. Fureman
Art Unit 2876

June 30, 2003